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XRD
136

CONFIDENTIAL
Security Information

BUREAU OF SHIPS GROUP

TECHNICAL INSPECTION REPORT

Classification (Cancelled) (Changed to Security Information
By Authority of JOINT CHIEFS OF STAFF JCS 1795/36 DATED 15 APRIL 1949
By *John H. Aggett* Date 22 SEP 1953

367490

⑥ OPERATION CROSSROADS.
U.S.S. NIAGARA (APA 87).

TEST BAKER U.S.

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Director
Defense Atomic Support Agency
Washington, D. C. 20301

⑪ 1947,

⑫ 34 P.

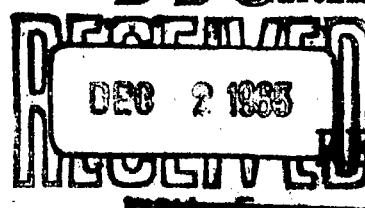
⑬ XRD-136

OPERATION CROSSROADS

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JOINT TASK FORCE ON



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Director
Defense Atomic Support Agency
Washington, D. C. 20301

APPROVED:

F.X. Forest,
Captain, U.S.N.

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USS NIAGARA (APA87)

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USS NIAGARA (APA87)

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U.S.S. NIAGARA (APA 87)

SHIP CHARACTERISTICS

Building Yard: Consolidated Steel Corp.; Wilmington, California.

Commissioned: 29 March 1945.

HULL

Length Overall: 426 feet 0 inches.

Length on Waterline: 400 feet 0 inches.

Beam (extreme): 58 feet 0 inches.

Depth (molded to upper deck): 37 feet 0 inches.

Drafts at time of test: Fwd. 9 feet 6 inches.

Aft. 16 feet 8 inches.

Limiting displacement: 7,080 tons.

Displacement at time of test: 5,633 tons.

MAIN PROPULSION PLANT

Main Engines: Two sets of Westinghouse steam turbines, directly connected to Westinghouse main generators. Two main propulsion motors.

Main Condensers: Two are installed in ship.

Boilers: Two Babcock and Wilcox boilers are installed in ship. 465 psi gauge - 750° F.

Propellers: Two are installed in ship.

Main Shafts: Two are installed in ship.

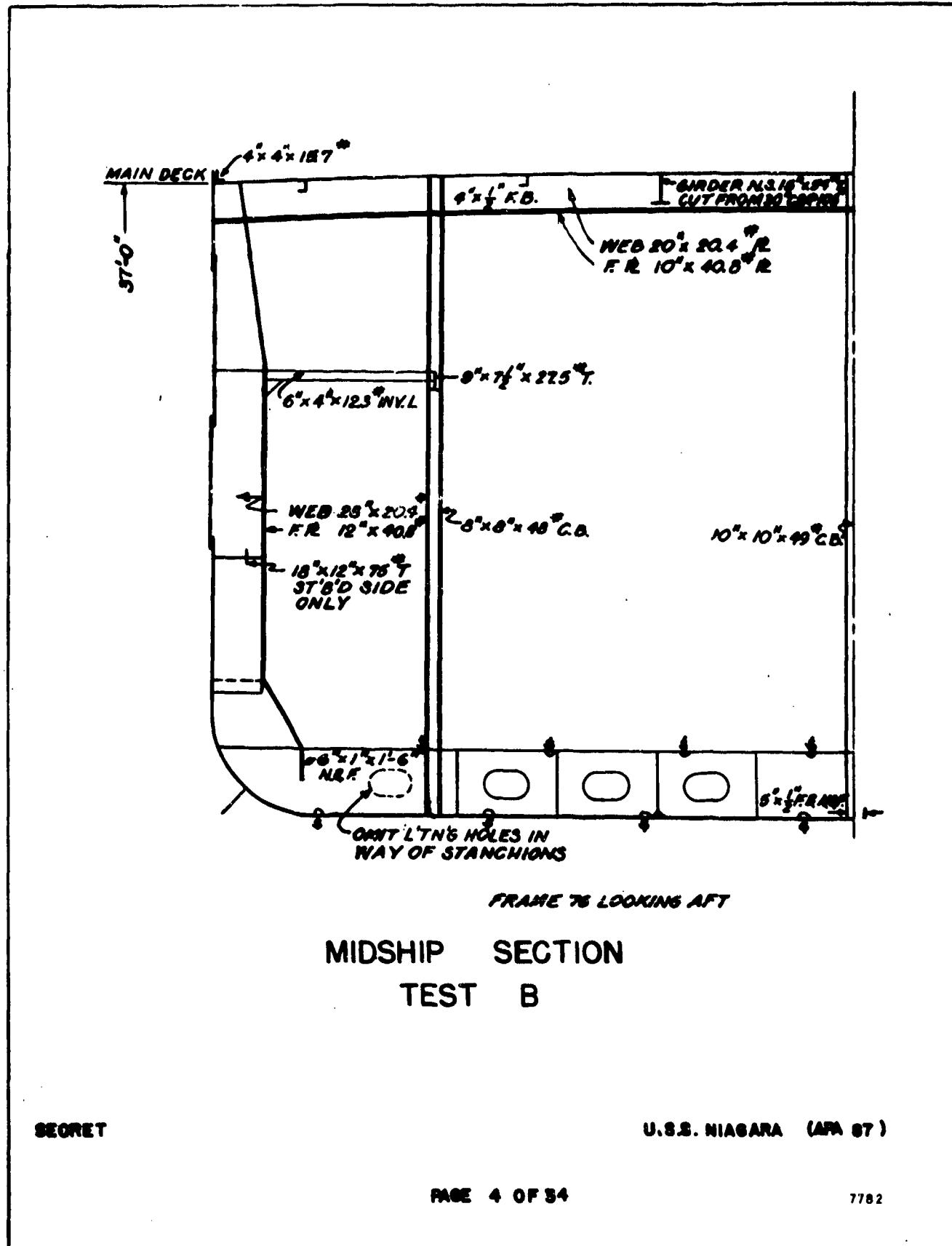
Ships Service Generators: Five units are installed.

Three - 250 KW. - 450 V. A. C., and Two - 100

KW. - 120/240 V. - D.C.

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USS NIAGARA (APA87)



TECHNICAL INSPECTION REPORT

OVERALL SUMMARY

I. Target Condition After Test.

- (a) Drafts after test; general areas of flooding, sources.

There is no flooding, hence no change in drafts or list.

- (b) Structural damage.

HULL

None.

MACHINERY

No comment.

ELECTRICAL

There was no structural damage. A few hatch boards were dislodged from upper deck of the forward and after cargo hatches. This caused no damage, electrical or otherwise.

- (c) Other damage.

HULL

Not observed.

MACHINERY

None.

ELECTRICAL

Close visual inspection and operating test conducted on

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practically all electrical equipment and electrical elements associated with ship control, fire control and gunnery revealed no damage whatsoever.

II. Forces Evidenced and Effects Noted.

(a) Heat.

HULL

None.

MACHINERY

No evidence.

ELECTRICAL

None.

(b) Fires and explosions.

HULL

None.

MACHINERY

No evidence.

ELECTRICAL

None.

(c) Shock.

HULL

About four metal sections of the upper deck covers of both cargo hatches were dislodged and fell to the main deck. This

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may have been caused by shock or by rapid motion of the ship.

MACHINERY

No evidence.

ELECTRICAL

1. Slight shock possibly in conjunction with negative pressure wave is believed to be cause of loosening and lifting hatch boards previously mentioned under I(b).

2. There was no damage to any electrical equipment as a result of shock.

(d) Pressure.

HULL

None.

MACHINERY

No evidence.

ELECTRICAL

There is no evidence of pressure except negative pressure described under shock, above.

(e) Effects peculiar to the Atomic Bomb.

HULL

None.

MACHINERY

None.

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ELECTRICAL

None other than radioactivity.

III. Results of Test on Target.

(a) Effect on machinery, electrical, and ship control.

HULL

Not observed.

MACHINERY

The test had no effect on the machinery of this vessel.
Full operation was resumed immediately after the test.

ELECTRICAL

None.

(b) Effect on gunnery and fire control.

HULL

Not observed.

MACHINERY

No comment.

ELECTRICAL

None.

(c) Effect on watertight integrity and stability.

HULL

None.

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MACHINERY

No comment.

ELECTRICAL

None.

(d) Effect on personnel and habitability.

HULL

None.

MACHINERY

None.

ELECTRICAL

Other than effects of radioactivity it is believed there would be no personnel casualties or any adverse effects on habitability.

(e) Effect on fighting efficiency.

HULL

None.

MACHINERY

None.

ELECTRICAL

There has been no reduction in the fighting efficiency of this vessel as a result of any material damage.

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IV. Summary of Observers' Impressions and Conclusions.

HULL

None.

MACHINERY

The NIAGARA was outside the effective range of the explosion during Test B.

ELECTRICAL

The position of this vessel in the array was such that it was not subjected to any unusual forces except radioactivity. There was no material damage. Approximately four days after blast ship was reboarded and she has since been underway. Normal shipboard routine has been established and the ship reported ready by the Commanding Officer for further assignment.

V. Preliminary Recommendations.

HULL

None.

MACHINERY

None.

ELECTRICAL

None.

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TECHNICAL INSPECTION REPORT

SECTION I - HULL

GENERAL SUMMARY OF HULL DAMAGE

I. Target Condition After Test.

(a) Drafts after test, general areas of flooding, sources.

There is no flooding, hence no change in drafts or list.

(b) Structural Damage.

None.

(c) Other damage.

Not observed.

II. Forces Evidence and Effects Noted.

(a) Heat.

None.

(b) Fires and Explosions.

None.

(c) Shock.

About four metal sections of the upper deck covers of both cargo hatches were dislodged and fell to the main deck; this may have been caused by shock or by rapid motion of the ship.

(d) Pressure.

None.

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(e) Effects peculiar to the Atomic Bomb.

None.

III. Results of Test on Target.

(a) Effect on machinery, electrical, and ship control.

Not observed.

(b) Effect on gunnery and fire control.

Not observed.

(c) Effect on watertight integrity and stability.

None.

(d) Effect on personnel and habitability.

None.

(e) Effect on fighting efficiency.

None.

IV. Summary of Observers Impressions and Conclusions.

None.

V. Preliminary Recommendations.

None.

VI. Instructions for loading the Vessel Specified the Following:

ITEM	LOADING
Fuel oil	Minimum
Diesel Oil	Minimum

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VI. (Continued).

ITEM	LOADING
Ammunition	10%
Portable and reserve feed water	95%
Salt water ballast	1280 tons

Details of the actual quantities of the various items aboard are included in Report 7, Stability Inspection Report submitted by the ship's force in accordance with "Instructions to Target Vessels for Tests and Observations by Ship's Force" issued by the Director of Ships Material. This report is available for inspection in the Bureau of Ships Crossroads Files.

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DETAILED DESCRIPTION OF HULL DAMAGE

A. General Description of Hull Damage.

There is no damage. The only effect of the test is the displacement of several hatch cover panels. A general view of the ship after the test is on page 30.

B. Superstructure.

No damage.

C. Turrets, Guns and Directors.

No damage.

D. Torpedo Mounts, Depth Charge Gear.

Not applicable.

E. Weather Deck.

No damage. About four metal sections of the upper deck covers of both cargo hatches were displaced and fell to the main deck. (Photos 2954-10, 11, pages 31 and 32).

F. Exterior Hull.

No damage.

G. Interior Compartments (above W.L.)

No damage.

H. Armor Decks and Miscellaneous Armor.

Not applicable.

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- I. Interior Compartments (below w.l.)
 - No damage.
- J. Underwater Hull.
 - No damage.
- K. Tanks.
 - No damage.
- L. Flooding.
 - None.
- M. Ventilation.
 - No damage.
- N. Ship Control.
 - No damage.
- O. Fire Control.
 - No damage.
- P. Ammunition Behavior.
 - No damage.
- Q. Ammunition Handling.
 - No damage.
- R. Strength.
 - No damage.
- S. Miscellaneous.
 - No comment.

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TECHNICAL INSPECTION REPORT

SECTION II - MACHINERY

GENERAL SUMMARY OF MACHINERY DAMAGE

I. Target Condition After Test.

(a) Drafts after test; list; general areas of flooding, sources.

No data taken by machinery group.

(b) Structural damage.

No comment.

(c) Other damage.

None.

II. Forces Evidenced and Effects Noted.

(a) Heat.

No evidence.

(b) Fires and explosions.

No evidence.

(c) Shock.

No evidence.

(d) Pressure.

No evidence.

(e) Effects apparently peculiar to the atom bomb.

None.

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III. Effects of Damage.

(a) Effect on machinery and ship control.

The test had no effect on the machinery of this vessel. Full operation was resumed immediately after the test.

(b) Effect on gunnery and fire control.

No comment.

(c) Effect on water-tight integrity and stability.

No comment.

(d) Effect on personnel and habitability.

None.

(e) Total effect on fighting efficiency.

None.

IV. General Summary.

The NIAGARA was outside the effective range of the explosion during Test B.

V. Preliminary Recommendations.

None.

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USS NIAGARA (APA87)

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DETAILED DESCRIPTION OF MACHINERY DAMAGE

A. General Description of Machinery Damage.

(a) Overall condition.

The overall condition of the machinery was not changed by Test B.

(b) Areas of major damage.

None.

(c) Primary cause of damage in each area of major damage.

None.

(d) Effect of target test on overall operation of machinery plant.

The test had no effect on the overall operation of the plant. Full operation was resumed immediately after the test.

B. Boilers.

Undamaged. Both boilers were steamed after Test B, and functioned normally.

HYDROSTATIC TESTS ON BOILER #1

	Before Test B	After Test B
Initial Pressure	450 lb/sq. in.	450 lb/sq. in.
Pressure remaining after		
30 minutes	250 lb/sq. in.	190 lb/sq. in.
1 hour	200 lb/sq. in.	100 lb/sq. in.
Pressure drop to 0	6 hours	9 hours

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C. Blowers.

Undamaged. The four force draft blowers were operated after Test B, and functioned normally.

D. Fuel Oil Equipment.

Undamaged. The fuel oil equipment was operated after Test B, and functioned normally.

E. Boiler Feedwater Equipment.

Undamaged. All boiler feedwater equipment was operated after Test B, and functioned normally.

F. Main Propulsion Machinery.

1. Undamaged. Both main engines were operated after Test B, and functioned normally.

2. Leads left in one bearing of No. 1 main turbo-generator indicate slight, if any, motion of the rotor.

#1 MAIN GENERATOR - INBOARD BEARING

Forward lead	Before Test B	After Test B	Difference
Port	.009	.009	.000
Top	.014	.014	.000
Stb'd	.010	.010	.000
<hr/>			
After lead			
Port	.007	.008	+ .001
Top	.012	.009	.003
Stb'd	.008	.008	.000

G. Reduction Gears.

Not Applicable.

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USS NIAGARA (APA87)

H. Shafting and Bearings.

Undamaged. Shafting and bearings were checked while the ship was underway after Test B, and functioned normally.

I. Lubrication System.

Undamaged. The lubrication systems were operated incident to operation of the main engines, and functioned normally.

J. Condensers and Air Ejectors.

Undamaged. The condensers and air ejectors were operated incident to operation of the main engines and ship's service generators, and functioned normally.

K. Pumps.

Undamaged. All the pumps were operated under power at rated pressures and normal operation was obtained.

L. Auxiliary Generators (Turbines and Gears).

1. Undamaged. All turbo-generators were operated under load, and functioned normally.

2. Leads left in one bearing of No. 1 ship's service generator during Test B, indicate slight motion of the rotor.

#1 SHIP'S SERVICE GENERATOR - BEARING BETWEEN TURBINE AND REDUCTION GEAR.

Forward lead	Before Test B	After Test B	Difference
Port	.009	.008	.001
Top	.011	.009	.002
Stb'd	.009	.009	.000

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Center lead	Before Test B	After Test B	Difference
Port	.009	.008	.001
Top	.011	.009	.002
Stb'd	.009	.008	.001
After lead			
Port	.010	.008	.002
Top	.011	.009	.002
Stb'd	.009	.008	.001

M. Propellers.

Undamaged. The propellers have not been inspected because of inaccessibility. Both propellers operated satisfactorily while the ship was underway.

N. Distilling Plant.

Undamaged. The evaporating plant was placed in operation immediately after Test B, and functioned normally.

O. Refrigeration Plant.

Undamaged. The refrigerating plant was placed in operation immediately after Test B. Performance was normal.

P. Winches, Windlasses, and Capstans.

Undamaged. All cargo winches and the forward and after windlasses were operated under power.

Q. Steering Engine.

Undamaged. Both steering units were operated from all stations while the ship was underway. Performance was normal.

R. Elevators, Ammunition Hoists, Etc..

Undamaged. All four ammunition hoists and the gasoline hoist were operated by power.

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S. Ventilation (Machinery)

Undamaged. All ventilation machinery was operated after Test B, and functioned normally.

T. Compressed Air Plant.

Undamaged. The air compressor was operated and found in normal operating condition.

U. Diesels (Generators and Boats.)

Undamaged. The diesel fire pumps and emergency diesel generator were operated after Test B, and functioned normally.

V. Piping Systems.

Undamaged. All piping systems were tested at normal working pressures, conditions normal.

W. Miscellaneous.

Undamaged. All laundry, galley, and machine shop equipment was operated after Test B, and functioned normally.

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TECHNICAL INSPECTION REPORT

SECTION III - ELECTRICAL

GENERAL SUMMARY OF ELECTRICAL DAMAGE

I. Target Condition After Test.

- (a) Drafts after test; list; general areas of flooding, sources.

Drafts after test, not observed. List, not observed.
Flooding, none.

- (b) Structural damage.

There was no structural damage. A few hatch boards were dislodged from upper deck of the forward and after cargo hatches. This caused no damage, electrical or otherwise.

- (c) Other damage.

Close visual inspection and operating test conducted on practically all electrical equipment and electrical elements associated with ship control, fire control and gunnery revealed no damage whatsoever.

II. Forces Evidenced and Effects Noted.

- (a) Heat.

None.

- (b) Fires and explosions.

None.

- (c) Shock.

1. Slight shock in conjunction with negative pressure

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wave is believed to be cause of loosening and lifting hatch boards previously mentioned under I(b).

2. There was no damage to any electrical equipment as a result of shock.

(d) Pressure.

There is no evidence of pressure except negative pressure described under shock, above.

(e) Any effects apparently peculiar to the atom bomb.

None, other than radioactivity.

III. Effects of Damage.

(a) Effect on propulsion and ship control.

None.

(b) Effect on gunnery and fire control.

None.

(c) Effect on water-tight integrity and stability.

None.

(d) Effect on personnel and habitability.

Other than effects of radioactivity it is believed there would be no personnel casualties or any adverse effects on habitability.

(e) Total effect on fighting efficiency.

There has been no reduction in the fighting efficiency of this vessel as a result of any material damage.

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IV. General Summary of Observers' Impressions and Conclusions.

The position of this vessel in the array was such that it was not subjected to any unusual forces except radioactivity. There was no material damage. Approximately four days after blast ship was reboarded and she has since been underway. Normal shipboard routine has been established and the ship reported ready by the Commanding Officer for further assignment.

V. Recommendations.

None.

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DETAILED DESCRIPTION OF ELECTRICAL DAMAGE

A. General Description of Electrical Damage.

(a) Overall condition.

The overall condition of the electrical equipment remained unchanged.

(b) Areas of major damage.

There was no damage.

(c) Primary causes of damage in each area of major damage.

No damage.

(d) Effect of target test on overall operation of electric plant.

1. Ship's service generator plant: No effect.
2. Engine and boiler auxiliaries: No effect.
3. Electric propulsion: No effect.
4. Communications: No effect.
5. Fire control circuits: No effect.
6. Ventilation: No effect.
7. Lighting: No effect.

(e) Types of equipment most affected.

No electrical damage.

B. Electric Propulsion Rotating Equipment.

No damage.

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USS NIAGARA (APA87)

C. Electric Propulsion Control Equipment.

No damage.

D. Generators - Ships Service.

No damage.

E. Generators - Emergency.

No damage.

F. Switchboards, Distribution and Transfer Panels.

No damage.

G. Wiring, Wiring Equipment and Wireways.

No damage.

H. Transformers.

No damage.

I. Submarine Propelling Batteries.

Not Applicable.

J. Portable Batteries.

No damage.

K. Motors, Motor Generator Sets and Motor Controllers.

No damage.

L. Lighting Equipment.

No damage.

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M. Searchlights.

No damage.

N. Degaussing Equipment.

No damage.

O. Gyro Compass Equipment.

No damage.

P. Sound Powered Telephones.

No damage.

Q. Ship's Service Telephones.

Not Applicable.

R. Announcing Systems.

No damage.

S. Telegraphs.

No damage.

T. Indicating Systems.

No damage.

U. I.C. and A.C.O. Switchboards.

No damage.

V. F.C. Switchboards.

No damage.

W. Miscellaneous.

No comment.

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SECTION IV

PHOTOGRAPHS

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SECTION IV

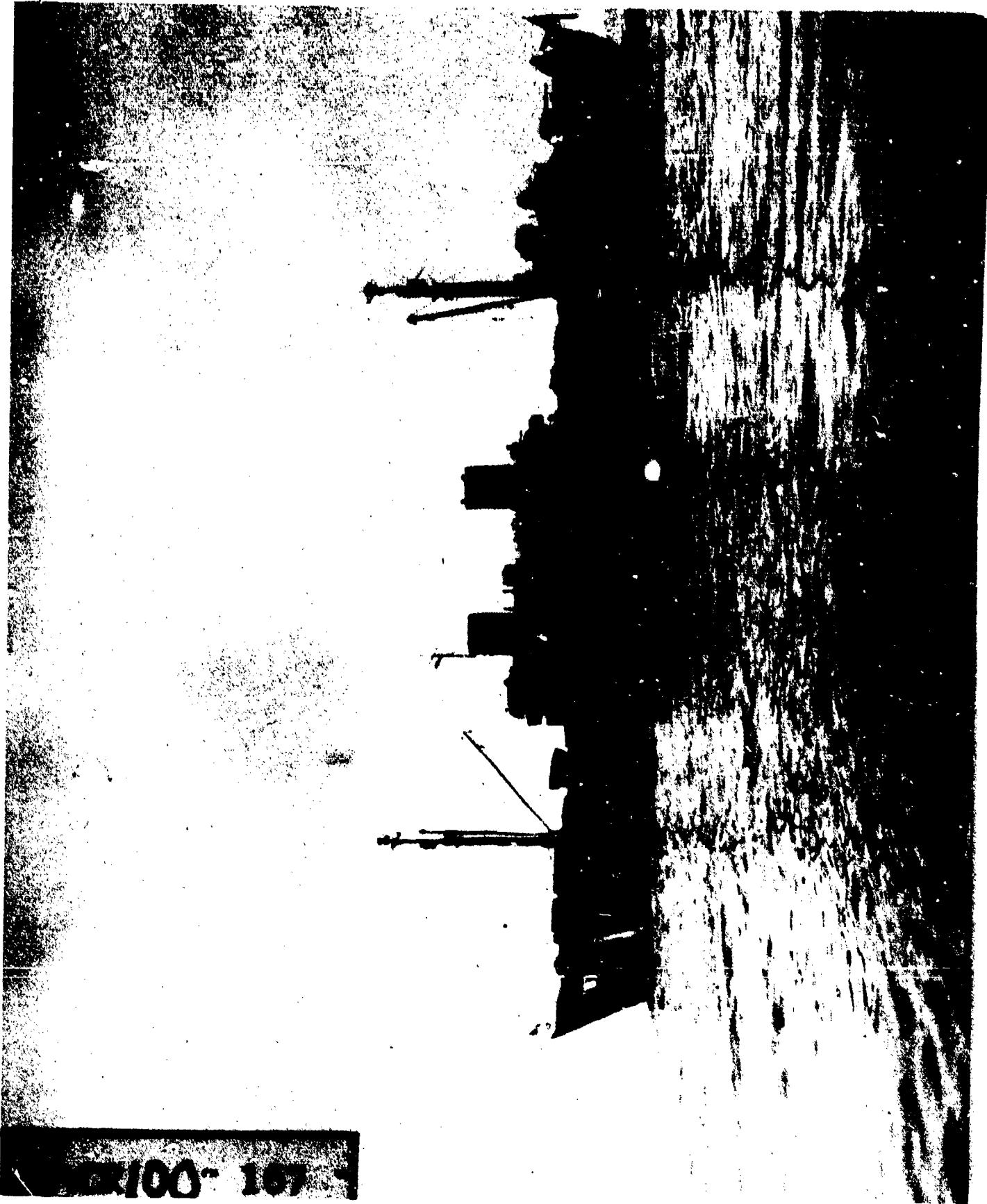
PHOTOGRAPHS

TEST BAKER

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AB-CR-100-167-2. View from off port beam after Test B.

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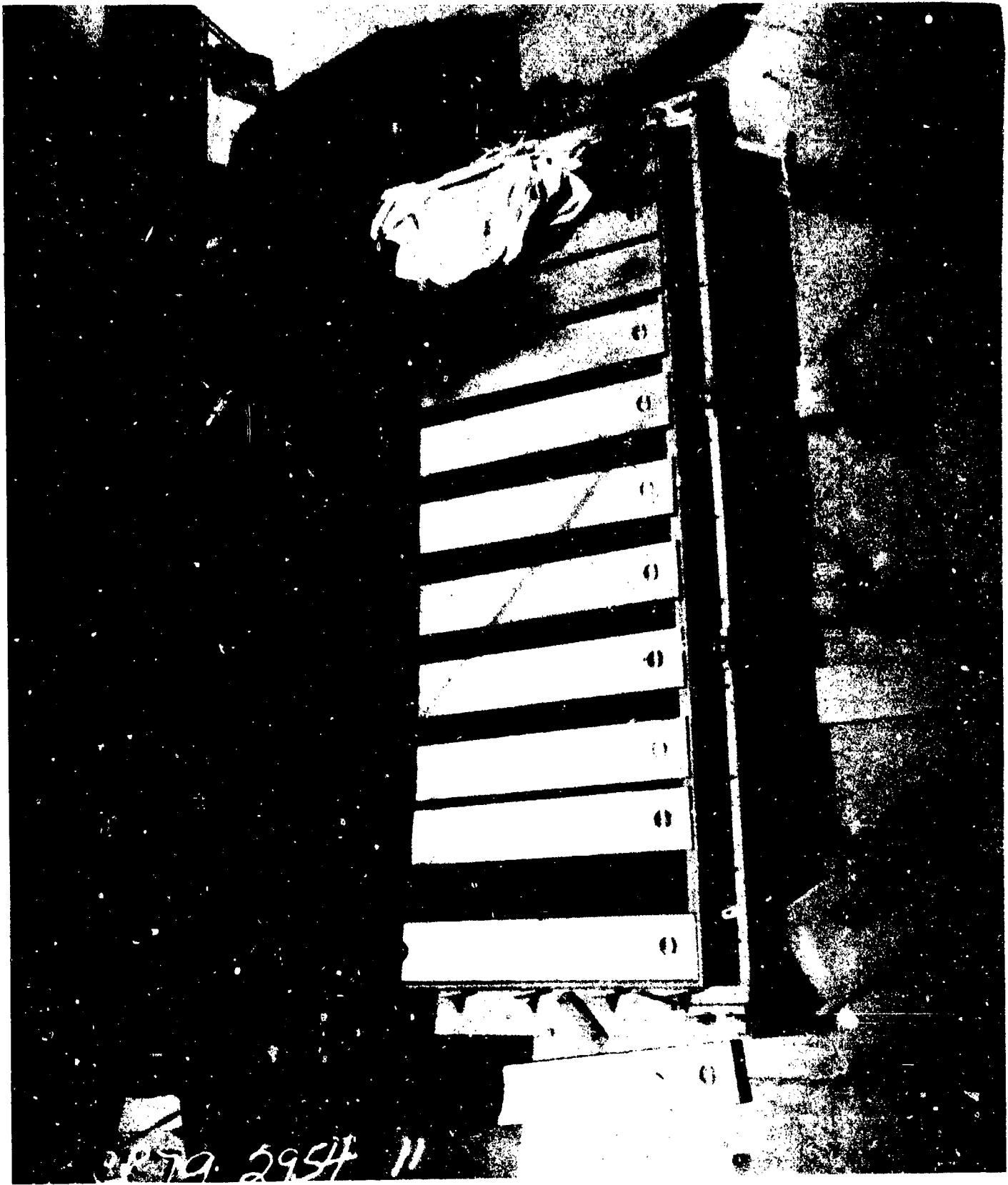
AB-CR-79-2954-10. Looking aft at displaced cover panels on forward cargo hatch.

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AB-CR-79-2954-11. Looking forward at displaced cover panels on forward cargo hatch.

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APPENDIX

COMMANDING OFFICERS REPORT

TEST BAKER

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COMMANDING OFFICERS REPORT

REPORT # 11

SECTION - I

As was in Test A several metal sections of both number one (1) and two (2) hatch covers jarred loose and fell to the main deck. Other than this there was no evidence of blast pressure.

No fires were started and all maximum and minimum thermometers located at various positions throughout the ship registered normal.

Both anchors held and no special loops were broken.

Upon reboarding, the ship was found to be geiger sweet except below the waterline adjacent to the ships sides. Readings at the bulkheads were .4R per day, which decreased to .1R per day at five (5) feet. These readings were taken on 29 July and persisted on 30 July. The ships side was scraped on 31 July from the waterline down to a depth of about seven (7) feet, which caused a reduction in geiger readings of 1R per day. The present intention is to operate at sea 1-2 August and attempt to clean the bottom as much as possible of loose corale and seaweed.

As of 1200, 1 August 1946 all equipment has been tested satisfactorily, all inspections made and all Crossroads forms submitted. The NIAGARA is ready for further assignment.

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Defense Special Weapons Agency
6801 Telegraph Road
Alexandria, Virginia 22310-3398

TRC

18 April 1997

MEMORANDUM FOR DEFENSE TECHNICAL INFORMATION CENTER
ATTENTION: OMI/Mr. William Bush (Security)

SUBJECT: Declassification of Reports

The Defense Special Weapons Agency has declassified the following reports:

✓AD-366588	XRD-203-Section 12✓
AD-366589	XRD-200-Section 9
AD-366590	XRD-204-Section 13
AD-366591	XRD-183
✓AD-366586	XRD-201-Section 10✓
✓AD-367487	XRD-131-Volume 2✓
✓AD-367516	XRD-143✓
✓AD-367493	XRD-142✓
AD-801410L	XRD-138
AD-376831L	XRD-83
AD-366759	XRD-80
✓AD-376830L	XRD-79✓
✓AD-376828L	XRD-76✓
✓AD-367464	XRD-106✓
AD-801404L	XRD-105-Volume 1
✓AD-367459	XRD-100✓

TRC

18 April 1997

Subject: Declassification of Reports

✓ AD-367517 X	XRD-141 ✓
AD-366762 ✓	XRD-84
AD-366760 ✓	XRD-81
AD-366761 ✓	XRD-82
AD-367501 ✓	XRD-158-Volume 1
AD-367507L ✓	XRD-152-Volume 4
✓ AD-367495 X	XRD-184 ✓
✓ AD-367485 X	XRD-129 ✓
✓ AD-367484 X	XRD-128 ✓
✓ AD-367483 X	XRD-127 ✓
✓ AD-367482 X	XRD-126 ✓
AD-367488 ✓	XRD-132
✓ AD-367480 X	XRD-124 ✓
AD-801409L ✓	XRD-135
AD-367490 X	XRD-136 ✓
AD-367492 X	XRD-137 ✓
AD-801411L ✓	XRD-139
AD-367518 X	XRD-140 ✓
AD-367515 ✓	XRD-144
AD-367514 ✓	XRD-145
AD-367468 X	XRD-110-Volume 2 ✓
AD-367513 ✓	XRD-146
AD-367497 X	XRD-162 ✓

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18 April 1997

Subject: Declassification of Reports

AD-801406L ✓ XRD-114.

In addition, all of the cited reports are now **approved for public release; distribution statement "A" now applies.**

Ardith Jarrett
ARDITH JARRETT
Chief, Technical Resource Center